PS005101-103

Digitized by the Internet Archive
in 2024

https://archive.org/details/manualsplus_02037

INSTRUCTION MANUAL FOR

LMPS

LAMBDA MODULAR POWER SYSTEM

LAMBDA ELECTRONICS INC.

Rev A
IM-LMPS

Table of Contents

1.0 INTRODUCTION ..... Page 3

2.0 GENERAL INFORMATION ..... Page 4
- 2.1 Physical Features 4
- 2.2 Electrical Features 4
- 2.3 Front Panel Features 4
  - 2.3.1 Non-metered Front Panel 4
  - 2.3.2 Metered Front Panel * 5

3.0 INSTALLATION ..... Page 6
- 3.1 Unpacking 6
- 3.2 Mounting and Cooling 6
- 3.3 Rear Panel Connections Layout 6
- 3.4 Wiring Control Signals * 7
- 3.5 Wiring AC Line Voltage 7
- 3.6 Wiring DC Outputs 7

4.0 INITIAL CHECKOUT ..... Page 10
- 4.1 Preparation 10
  - 4.1.1 Using The Digital Output Display * 11
  - 4.1.2 Using the Metering Limit Modes * 11

5.0 OPERATION ..... Page 13
- 5.1 ON/OFF Circuit Breaker 13
- 5.2 System Configurations 13
  - 5.2.1 Non-metered Front Panel 13
  - 5.2.2 Metered Front Panel * 13

6.0 SPECIFICATIONS AND FEATURES ..... Page 17
- 6.1 Regulated Voltage Output 17
- 6.2 AC Input 17
- 6.3 Overload Protection 17
- 6.4 Overvoltage Protection 17
- 6.5 Operating Ambient Temperature Range and Duty Cycle 17
- 6.6 Storage Temperature 17
- 6.7 Input/Output Connections 17
- 6.8 Meters * 18
- 6.9 Physical Data 18
- 6.10 Isolation Ratings 18
- 6.11 Status Signals * 18
- 6.12 Specifications for Rear Panels 19
  - 6.12.1 25 Amp Rear Panel 19
  - 6.12.2 400 Amp Rear Panel 19

* applies to metering systems only

Table of Contents, cont'd

7.0 SYSTEM CONFIGURATION ..... Page 20
- 7.1 AC Line Configuration 20
- 7.2 Rear Panel Configuration 21

8.0 CALIBRATION ..... Page 22
- 8.1 Setting the Number of Power Supplies 22
- 8.2 Setting the Voltage Scale 22
- 8.3 Setting the Current Scale 24
- 8.4 Calibrating the Current Offset 24
- 8.5 Calibration of Current at Full Scale 24
- 8.6 Calibration of Voltage at Full Scale 25
- 8.7 Display of Micro Revision Level 25

APPENDIX A - BLOCK DIAGRAM ..... Page 26
- Block Diagram for a Metered System 26

APPENDIX B - SCHEMATICS ..... Page 27
- Pot Board HAL-02-650 28
- 25 Amp Non-metered HAL-02-646-2 29
- 25 Amp Metered HAL-02-646 30
- 400 Amp Non-metered HAL-02-645-2 31
- 400 Amp Metered HAL-02-645 32
- Display Driver HAL-02-643 33
- Microcontroller HAL-02-644 34

LIST OF FIGURES

- 1-1 Modular Power System Assemblies 3
- 2-1 Non-metered Front Panel 4
- 2-2 Metered Front Panel 5
- 3-1 Rear Panel Connections Layout 6
- 3-2 AC Panel 7
- 3-3 Cable Length "A" in Feet 8
- 3-4 Cable Connection Chart 8
- 3-5 DC Output Schematic 9
- 4-1 Basic Front Panel Controls 11
- 5-1 Rear Panel Signals vs. Modes 16
- 5-2 Front Panel Displays vs. Modes 14
- 5-3 Panel Switch Function vs. Modes 15
- 7-1 AC Line Switch Tampering Caution 20
- 7-2 Rear Panel Jumper Configuration 21
- 8-1 Calibration Switch and Location 22
- 8-2 Calibration Modes 23

* applies to metering systems only

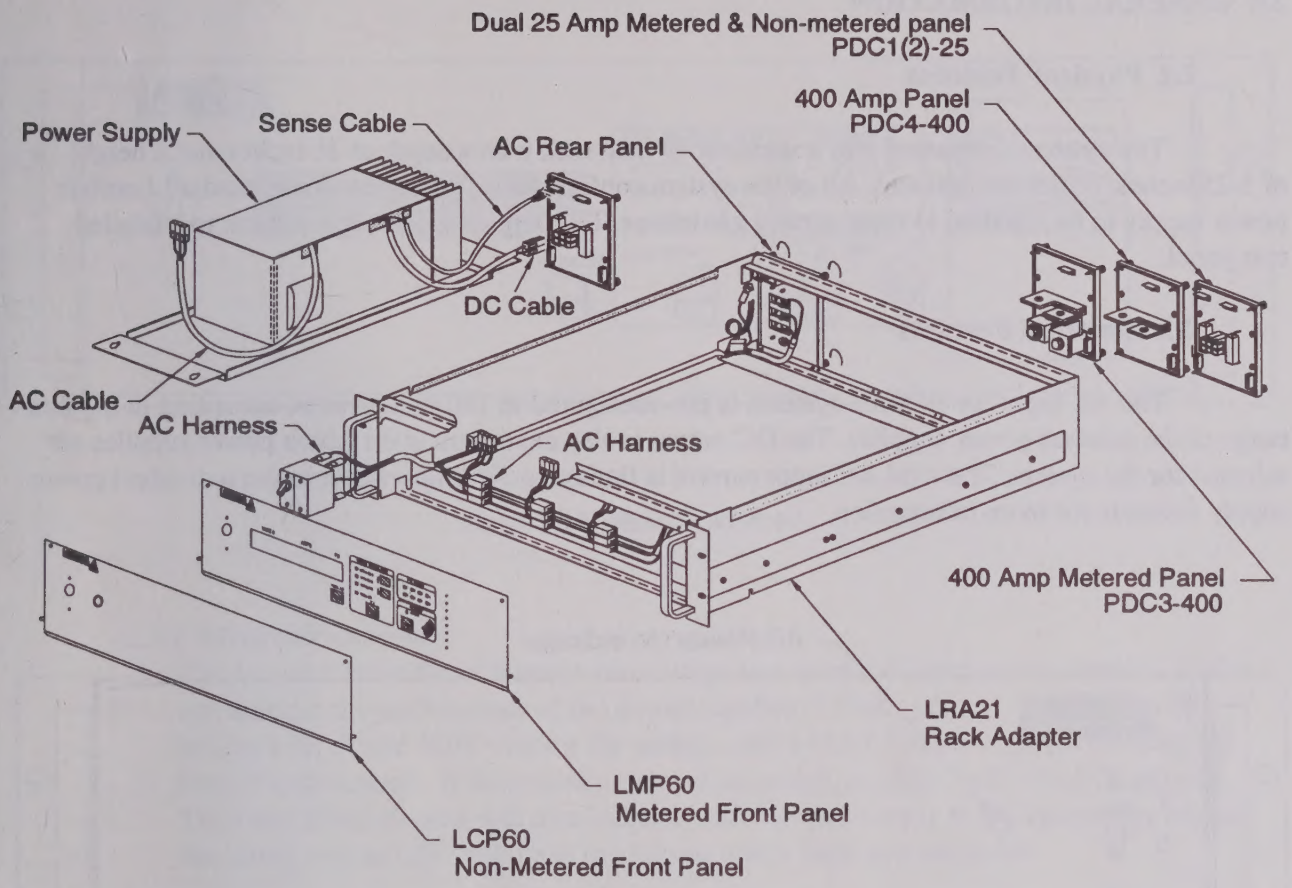


Figure 1-1 Modular Power System Assemblies

1.0 INTRODUCTION

The Lambda Modular Power System (LMPS) can be configured with up to eight power supplies.

The system is available in two different configurations:

1. Non-metered panel
2. Metered panel

Each LMPS is customized from standard modules, built to include the power supplies and the front panel chosen by you. This manual describes the installation, operation and specifications of the standard system.

2.0 GENERAL INFORMATION

2.1 Physical Features

The system is mounted into a standard 19 inch rack with a depth of 21 inches and a height of 5.25 inches. Slides are optional. All of the system configurations will allow for a standard Lambda power supply to be installed to meet agency guidelines. The outputs will be brought out to a labeled rear panel.

2.2 Electrical Features

The AC input for all three systems is pre-configured to 110 or 220 volts, according to the line range of the selected power supplies. The DC output is also dependent upon which power supplies are selected for the system. The total AC input current is limited to 30 Amps. Refer to the individual power supply manuals for more information.

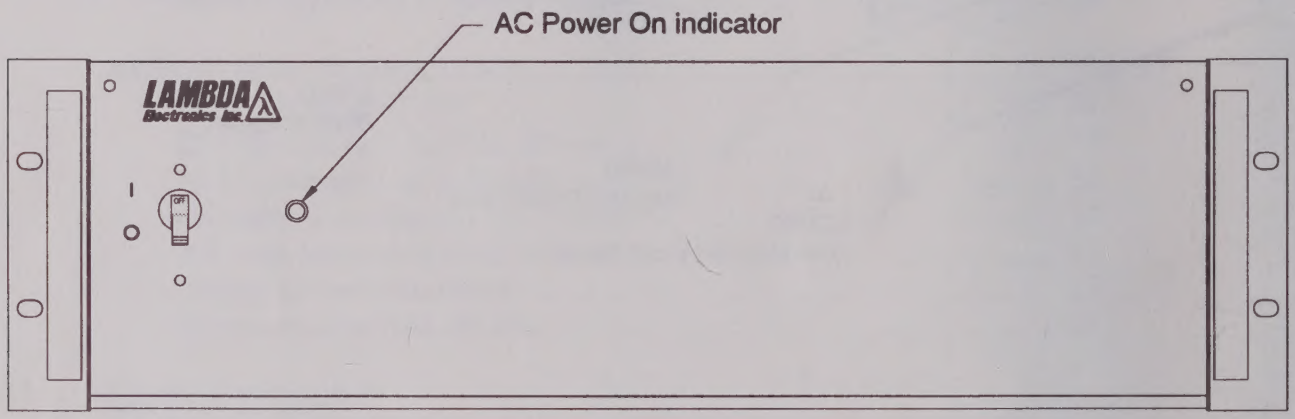


Figure 2-1 Non-metered Front Panel

2.3 Front Panel Features

2.3.1 Non-metered Front Panel

Features

- Low Cost
- Circuit breaker on/off switch
- Low MTTR, Modular design
- AC Power ON indicator

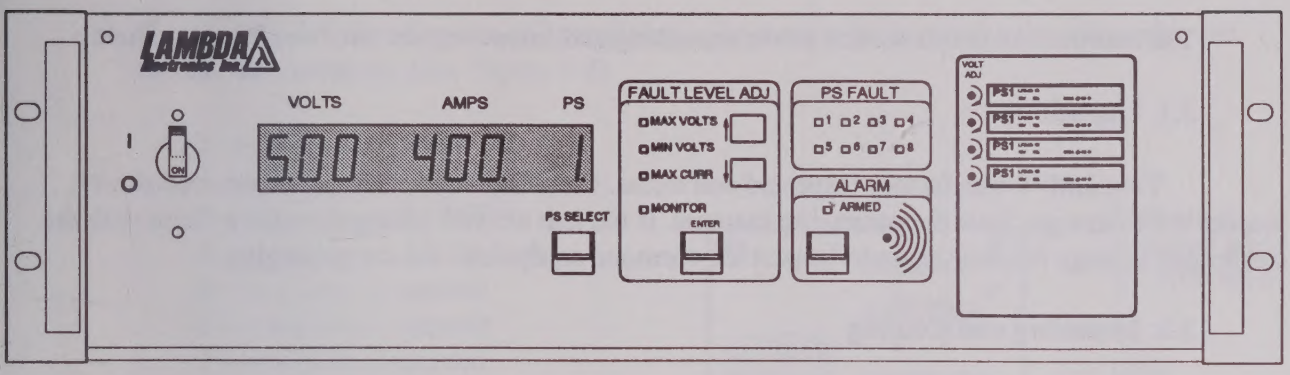


Figure 2-2 Metered Front Panel

2.3.2 Metered Front Panel

The Metered Front Panel displays the voltage and current of your power supplies. It also can monitor the performance of the power supplies to limits you set. This is done by setting a MAX and MIN window for voltage, and a MAX limit for current by using the Front Panel controls. If these limits are ever exceeded, an alarm will sound (if armed). The Front Panel display will then indicate which power supply in the system has tripped the alarm, and an LED will flash to indicate which limit was exceeded.

Features

- Limits selected by the user to monitor each power supply (up to eight supplies) for:
  maximum voltage
  minimum voltage
  maximum current

- Fault warnings for the following conditions:
  Voltage outside the limit set by the user
  Current exceeds the maximum limit

- Fault indicators
  Audible alarm
  Panel LED's

- AC and DC TTL status
  AC Fail Output (Open Collector)
  Power Supply Fault Output (Open Collector)
  Reset Input (TTL level)

- Low MTTR, Modular Design

3.0 INSTALLATION

The instructions in this section cover unpacking and inspecting the Modular Power System.

3.1 Unpacking

Your LMPS was factory inspected and tested. Carefully unpack the unit upon receipt and inspect it for damage. Save the packaging material. If the unit arrived damaged, make a claim with the carrier and arrange for their agent to inspect the damaged equipment and the packaging.

3.2 Mounting and Cooling

Your LMPS is rated for full load operation at 40°C. When mounted in rack cabinets, these systems need unrestricted airflow through the rack adapter from bottom to top. This can be achieved by providing sufficient space above and below the LMPS. To protect your other system components from the heat generated by the LMPS, place the LMPS as close to the top of the rack cabinet as possible.

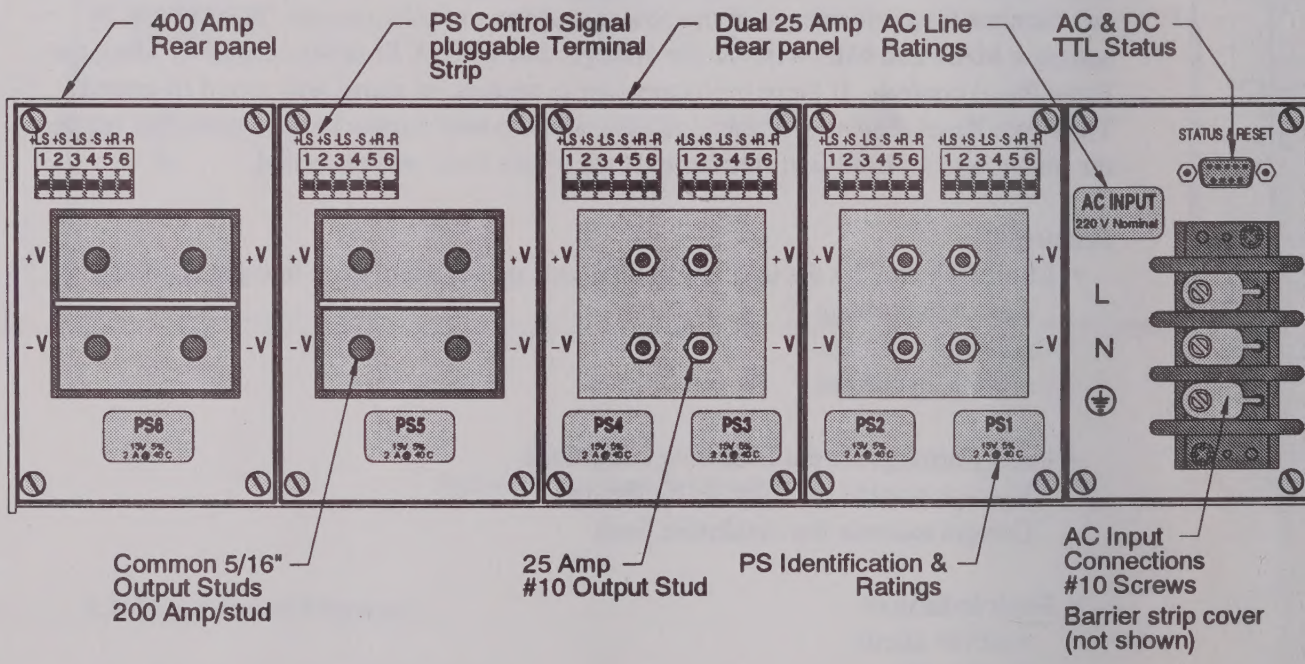


Figure 3-1 Rear Panel Connections Layout
Note: Rear Panel selection location is based on your custom order.

3.3 Rear Panel Connections Layout

The AC panel is located right-most when viewed from the rear. The AC panel is used for connecting the AC line to a three-pole terminal strip, and the system status lines to a nine pin "D" connector (optional). Power supply one will be the first output located next to the AC panel. After that, all other power supply numbers will be sequential. High current connections are made from rear panel studs, while control signals are provided via a 6 pin "pluggable" terminal strip (mate provided).

3.4 Wiring Control Signals (optional, Metering with Status Front Panel only)

The signals are located on the AC panel above the three-pole terminal strip with a nine pin female "D" connector (See Figure 3-2).

1 ---------- GND
2 ---------- PS FAIL *
3 ---------- RESET *
4 ---------- AC FAIL *
5 ---------- unused
6 ---------- unused
7 ---------- unused
8 ---------- unused
9 ---------- unused

*denotes active low signal

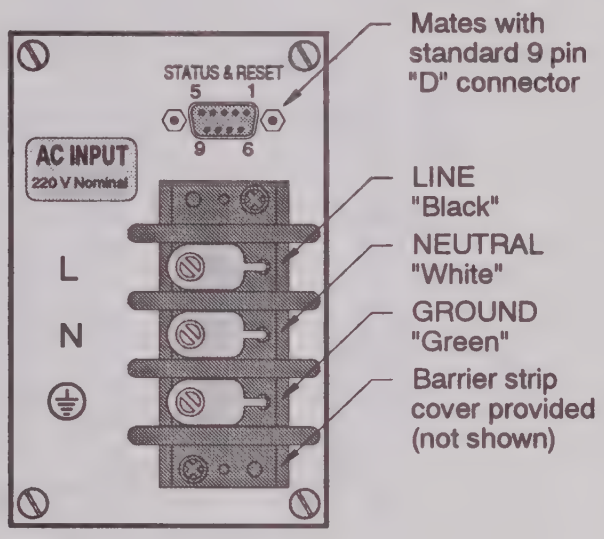


Figure 3-2 AC Panel

3.5 Wiring AC Line Voltage

AC line voltage has been configured per your instructions during the building of your assembly. Please be sure that the AC label on the system agrees with your intended line voltage before powering up the system.

Warning - *If an incorrect AC line voltage is applied, it could result in damage to your system.*

3.6 Wiring DC Outputs

The Modular Power System DC output is available at the rear panel. Wire this output from +V, -V to your load (s) with cable made from insulated, stranded wire. For best results, twist or ty-wrap the positive and negative wires together to minimize magnetic pickup.

Warning - *Because of the risk of fire, select a wire size that will safely handle the full rated current available at that output.*

For each of the outputs, select a suitable wire size and voltage sensing method (local or remote sense). Figures 3-3 and 3-4 (on the following page) can help you pick a wire size. For one way distances of two feet or less (or under four feet round trip), wires may be sized by temperature consideration only. For one way lengths exceeding two feet, voltage drops may become excessive even though the wire is used safely within its rating.

Figure 3-3 Cable Length "A" in Feet

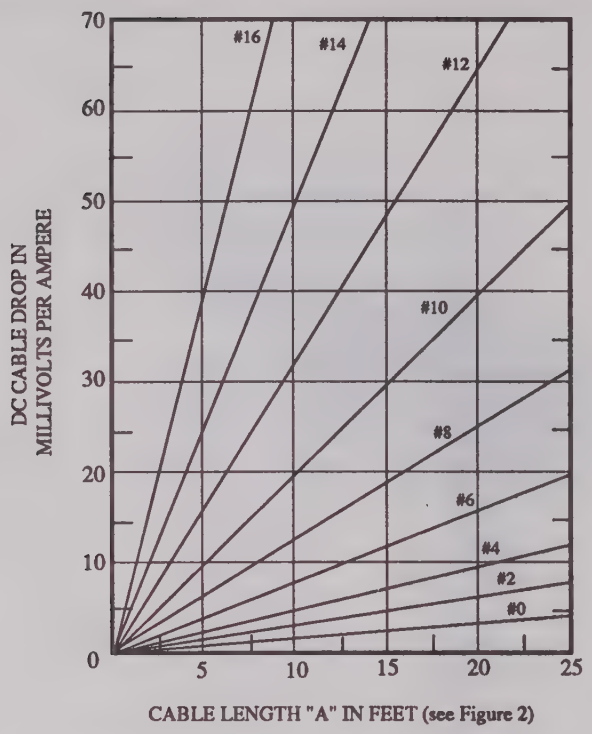
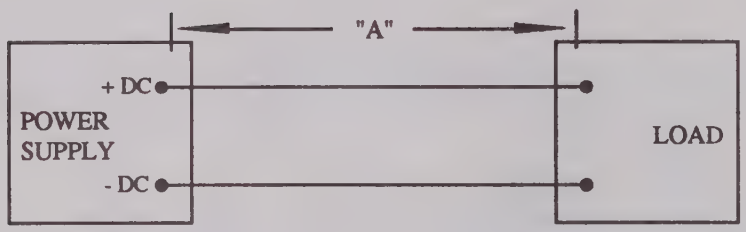


Figure 3-4 Cable Connection Chart



The power supply senses its own voltage from the sense terminals (+S, -S) at the output pluggable terminal sockets, using this information to correct its output. The Modular Power System outputs come factory wired for local voltage sensing. Factory installed jumper wires connect +V to +S and -V to -S at the rear panel, so programmed voltages are accurate to specification at this point. To simplify initial setup and testing, we suggest starting with local sense, as shown in Figure 3-5 (see Page 9).

Local sense does not give optimal voltage accuracy at the load A local sense hookup will produce a voltage loss between the Modular Power System output and the load. A remote sense hookup will sense the actual load voltage to effectively eliminate the effect of lead loss. To convert an output to remote sense, simply remove the factory-provided jumpers and run an extra pair of wires to the desired sense point at the load as shown in Figure 3-5 (see Page 9). These sense wires may be #18 - #24, preferably a twisted pair.

Caution: *Carefully check remote sense wiring before energizing the Modular Power System. Missing sense wires may cause the affected output to increase beyond its maximum voltage rating, tripping the power supply overvoltage protection.*

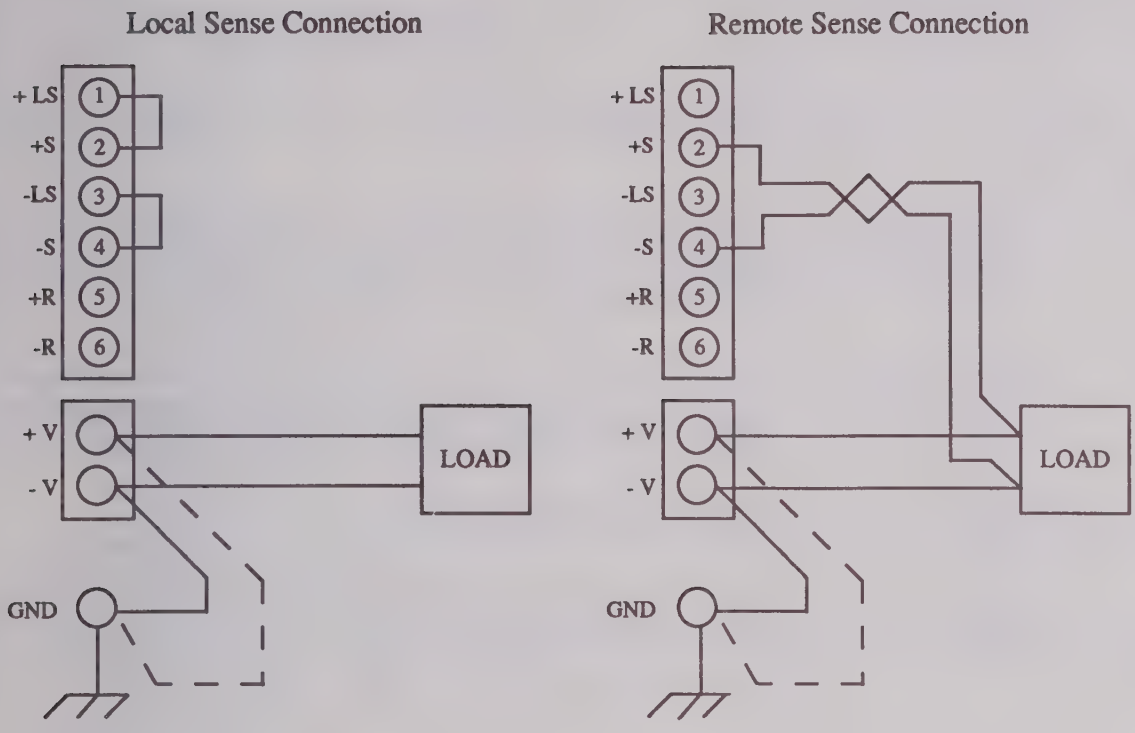


Figure 3-5 DC Output Schematic

SAFETY NOTICE: DANGEROUS VOLTAGES EXIST IN THIS EQUIPMENT. OBSERVE THE USUAL SAFETY PRECAUTIONS WHEN OPERATING OR SERVICING THE EQUIPMENT TO AVOID SHOCK OR INJURY.

4.0 INITIAL CHECKOUT

This section describes how to set up a Modular Power System for a bench test, and gets you started with controlling this system.

4.1 Preparation

Use the list below as a check-list of connections to make, referring to the *Installation* section where necessary.

1. With the AC power off, connect your line cord to the terminal strip on the AC panel. Check to make sure your line voltage is within the range displayed on the rear AC panel. If your line voltage is not within the range displayed on this label, *do not proceed.*

2. Check to see that at each DC output the factory installed local voltage sensing jumpers (from +S to LS, and from -S to LS) are intact. For initial check-out, it is not necessary to connect any loads. To verify output operation, connect a suitable voltmeter to the output.

3. Keep the ON/OFF switch off, and turn on your AC line.

4. Turn your Modular Power System ON. All the front panel LED's will go on for two seconds. If one of the LED's should fail to light, then there is a fault in the metering system.

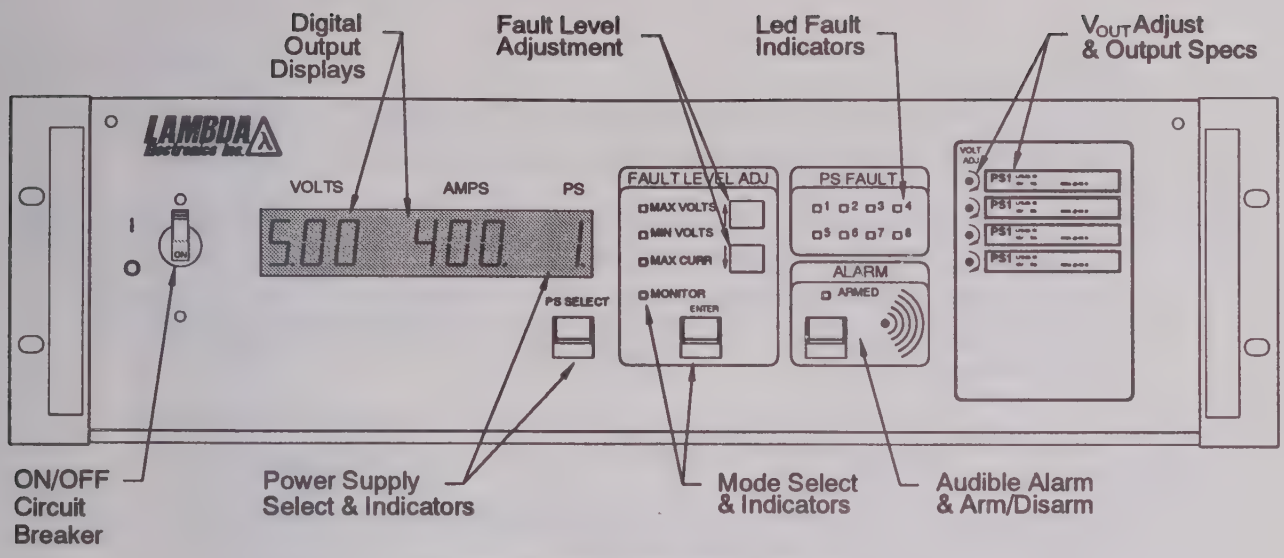


Figure 4-1 Basic Front Panel Controls

4.1.1 Using the Digital Output Display (Metered system only)

At this point the front panel should be operational, with all the limits you requested preset at the factory. There should be no fault LED's on at this time. The standard power-up sequence will leave you in the monitor mode.

1. Use the PS SELECT switch to select a power supply. Read the voltage display; this is the differential voltage for the selected power supply from -S to +S.

2. Repeat step one for all the outputs to verify operation.

4.1.2 Using the Metering Limit Modes (Metered system only)

The panel should be in the monitor mode, with no fault LED's on at this time. To observe a fault indication:

MAX VOLTS FAULT

1. Using the ENTER key, change the mode to MAX VOLT MODE. If you pass this mode, simply keep hitting the ENTER key until it comes around again.

2. Now adjust the limit. Use the ADJUST DOWN key to set the limit just above the power supply voltage. If the limit goes below the power supply voltage, the mode LED will blink and the FAULT LED of that power supply will come on. Use the ADJUST UP key to correct this. The alarm will not sound, even if ARMED. The alarm will only sound if in the monitor mode.

3. Return the mode to the monitor mode.

4. Use the voltage adjustment (located next to the power supply label) to bring the output voltage above the limit (MAX VOLTS limit).

5. When the output voltage rises above the limit set in Step 2, the LED FAULT indicators will show the out-of-limit supply, and the MODE INDICATORS will blink, indicating which limit has been exceeded.

MIN VOLTS FAULT

1. Using the ENTER key, change the mode to MIN VOLT MODE. If you pass this mode, simply keep hitting the ENTER key until it comes around again.

2. Now adjust the limit. Use the ADJUST UP key to set the limit just below the power supply voltage. If the limit goes above the power supply voltage, the mode LED will blink and the FAULT LED of that power supply will come on. Use the ADJUST DOWN key to correct this. The alarm will not sound, even if ARMED. The alarm will only sound if in the monitor mode.

3. Return the mode to the monitor mode.

4. Use the voltage adjustment (located next to the power supply label) to bring the output voltage below the limit (MIN VOLTS limit).

5. When the output voltage falls below the limit set in Step 2, the LED FAULT indicators will show the out-of-limit supply, and the MODE INDICATORS will blink, indicating which limit has been exceeded.

MAX CURR FAULT

1. Using the ENTER key, change the mode to MAX CURR MODE. If you pass this mode, simply keep hitting the ENTER key until it comes around again.

2. Now adjust the limit. Use the ADJUST DOWN key to set the limit below the power supply's rated current. If the limit goes below the power supply current, the mode LED will blink and the FAULT LED of that power supply will come on. Use the ADJUST UP key to correct this. The alarm will not sound, even if ARMED. The alarm will only sound if in the monitor mode.

3. Return the mode to the monitor mode.

4. Apply a load to the power supply, above the MAX CURR limit.

5. When the output current rises above the limit set in Step 2, the LED FAULT indicators will show the out-of-limit supply, and the MODE INDICATORS will blink, indicating which limit has been exceeded.

5.0 OPERATION

5.1 ON/Off Circuit Breaker

The ON/OFF switch is located on the front panel for all system configurations. The switch is a 30 Amp panel-mounted circuit breaker. It has been selected to match the high inrush currents required by power supplies. This switch controls power for all the equipment found in the system.

5.2 System Configurations

The system is available in two configurations:

5.2.1 Non-metered Panel - With this system, a circuit breaker is provided to power all the installed power supplies. Rear panel connections are provided for +/-V, +/-S and +/-R. These connect directly to the associated terminals on the power supplies. Treat these connections as if they were the related power supply connections. For output voltage and overvoltage adjustments (if provided) refer to the specific power supply manual.

5.2.2 Metered Front Panel (Refer to Figure 5-1)- This system will provide metering and limit-checking for all the power supplies installed in the system. Voltage adjustment for each individual power supply is also provided. Output voltage adjustment is accomplished by using the marked screwdriver holes to the left of each power supply label. Use the "PS SELECT" switch to display the power supply you wish to adjust. Then insert a small screwdriver into the adjust hole. Turn clockwise to increase the voltage, and turn counterclockwise to decrease the voltage.

CAUTION - *Do not adjust the voltage beyond the specified range printed on the label.*

The system is equipped with AC and DC status signals, (AC FAIL*, PS FAULT*) which provide the status for the system. If any power supply exceeds its limits, the PS FAULT* will signal it and latch the fault. If the AC line drops out, an early detect AC FAIL* will be reported. This signal and the system fault are open collector outputs. There is also a RESET* line used to reset the system, unlatching the system fault signal if one exists. All of the status lines share a common ground, isolated from the chassis and all outputs. It may be floated up to 100 Volts from any power supply -V output. See Figure 5-1 above for Rear Panel Signals vs. Modes.

The metering system operates in two basic modes. Use the "MODE" key to select among them. These modes are used to set max volt limit, min volt limit, max current and to monitor a specific power supply. See Figure 5-2 for Front Panel Displays vs. Modes. Figure 5-3 shows Panel Switch Function vs. Modes.

REAR PANEL SIGNALS	MODES OF OPERATION			
	MONITOR	SET LIMITS FOR MONITORING		
		MAX VOLT	MIN VOLT	MAX CURR
RESET active low				
PS Fault	Latch low upon any Power Supply outside of the limits. Use RESET to reset			
AC Fault	Goes Low 4 - 12 mS after Line cycle is missed			

Figure 5-1 Rear Panel Signals vs. Modes

		MODES OF OPERATION			
		MONITOR	SET LIMITS MODE		
			MAX VOLT	MIN VOLT	MAX CURR
DISPLAY READ-OUTS	PS (SINGLE DIGIT DISPLAY)	Shows Selected Power Supply (1 THROUGH 8)			
	Volts (3 DIGIT DISPLAY)	PS Volts	PS Max. Limit	PS Min. Limit	Blank
	Amps (3 DIGIT DISPLAY)	PS Curr.	Blank	Blank	PS Max. Limit
DISCRETE LED'S	Monitor LED	RED	OFF	OFF	OFF
Blinks through all modes if selected PS exceeds the associated limit.	Max. Volts LED	OFF	RED	OFF	OFF
	Min. Volts LED	OFF	OFF	RED	OFF
	Max. Curr. LED	OFF	OFF	OFF	RED
	PS Fault LED'S	Shows all Power Supplies outside of limits			
	Armed LED	RED if alarm is armed			

Figure 5-2 Front Panel Displays vs. Modes

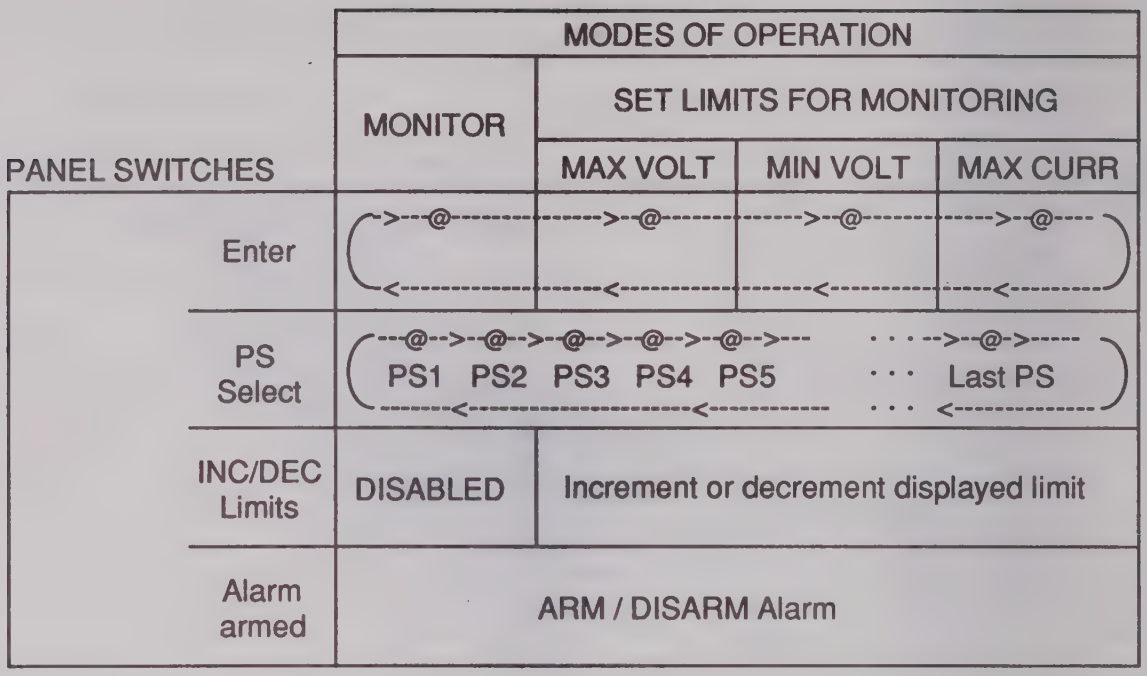


Figure 5-3 Panel Switch Function vs. Modes

5.2.2, continued

1. Monitor Mode - The monitor mode is used to display the current and voltage of a selected power supply. The monitor mode light will be on when in this mode. By using the power supply select key, any one of the power supplies can be displayed. In addition to the digital output display, all of the configured power supplies are continuously monitored. If any limits are exceeded, the system will indicate this with the fault LED's, audible alarm (if armed), and status signals (optional). When a pre-set limit is exceeded while in the monitor mode, the digital output display will switch to the faulted power supply. This will display the actual values being read for the faulted power supply. The fault will also show up on the LED fault indicators and the mode indicators will show how the supply has failed. If the "ARMED" light is lit an audible warning will sound off. To shut it off, press the "ARMED" switch to toggle it off.

2. Limit Setting Modes - The"limit setting" modes (max volt, min volt, max current) are used to display and change the set limits of a selected power supply. When in this mode, all channel limits can be displayed by using the "PS SELECT" key. When using this function, note that the displayed limits will not be changed. Adjustment of the limits is done by using the "ADJUST" up and down key. These keys will change the limit up or down by one. For larger changes, hold the adjust key depressed for approximately 3 seconds. This will speed up the change. To save the limits, use the "ENTER" key. This will save the limit displayed to the power supply displayed. This procedure can be used for setting the limits for max volt, min volt and max current.

6.0 SPECIFICATIONS AND FEATURES

6.1 Regulated Voltage Output - Refer to the individual manual for each power supply installed in your system.

6.2 AC Input

Line voltage, metered..... 85 - 132 VAC or
(according to the installed power supplies) 170 - 265 VAC
47 to 63 Hz

Line voltage, no meter..... Refer to the individual manual for each power supply installed in your system.

Input RMS current..... 30 Amps max. (sum of all power supplies)

6.3 Overload Protection

Thermal..... Refer to the individual manual for each power supply installed in your system.

Electrical Input..... 30A/250V two pole magnetic circuit breaker, 50/60Hz

Outputs..... All outputs are protected against overcurrent conditions.

6.4 Overvoltage Protection - Refer to the individual manual for each power supply installed in you system. (available as an option when not standard).

6.5 Operating Ambient Temperature Range and Duty Cycle - Refer to the individual manual for each power supply installed in your system. The LMPS metered system is limited to 0°C minimum.

6.6 Storage Temperature (Non-operating) -55°C to +85°C.

6.7 Input / Output Connections

AC input and line safety ground ..... AC panel barrier Strip, #10 screws
30 Amps max

DC output ..... 25 Amp max - #10 stud
400 Amp max - two 5/16" studs
Each stud is rated at 200 Amps max

DC Control Signals ..... 6 pin pluggable terminal
(mate provided)

6.8 Meters

Voltage, 3 digit read-out, 1% accuracy
- 9.99 +/- 0.10 Volts
- 99.9 +/- 01.0 Volts

Current, 3 digit read-out, 3% accuracy
- 25.0 +/- 00.7 Amps
- 400. +/- 012. Amps

6.9 Physical Data

Size (approximate) ..... 19" x 5.25" 21" (excluding front panel handles)

Finish..... Off white, FED STD 595, No. 26622

6.10 Isolation Ratings - Each output is limited to its power supply rating, or the ratings of the power system (see below) whichever is less. See the manual(s) for the installed power supplies.

Input to output..... 3000 Volts rms MAX

Output to ground..... 500 Volts rms MAX

Input to ground ..... 1500 Volts rms MAX

6.11 Status Signals

PS FAULT* output
- Response time 1 second
- Open Collector
- TTL compatible 0.8 Volts @ 100mA
- max volt 50 Volts

AC FAULT* output (trigger on falling edge only)
- Open Collector
- Response time 4 - 12 mSec
- TTL compatible 0.8 Volts @ 100 mA
- max current 100 mA
- max volt 50 Volts

RESET* input
- TTL level
- max volt 50 Volts

* denotes an active low signal

6.12 Specifications for Rear Panels - for both panels, -V to -S must not exceed 2 Volts to maintain accuracy.

6.12.1 25 Amp Rear Panel

Volts ---------- 0 to 100 Volts (jumper selectable; 0-10 Volts or 0-100 Volts)
Current --------- 25 Amps MAX.

6.12.2 400 Amp Rear Panel

Volts ---------- 0 to 100 Volts (jumper selectable; 0-10 Volts or 0-100 Volts)
Current --------- 400 Amps MAX

7.0 CONFIGURING THE SYSTEM

7.1 AC Line Configuration

All systems have been shipped preconfigured. A 110 or 220 line, and the AC panel have been labeled accordingly. *Do not attempt to change this configuration.*

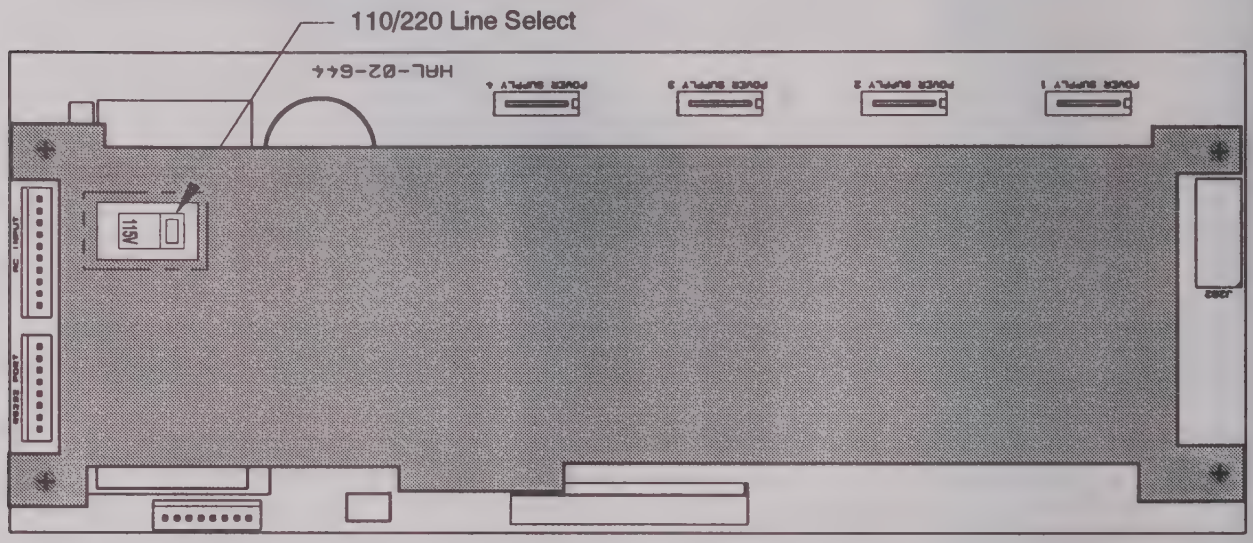


Figure 7-1 AC Line Switch Tampering Caution

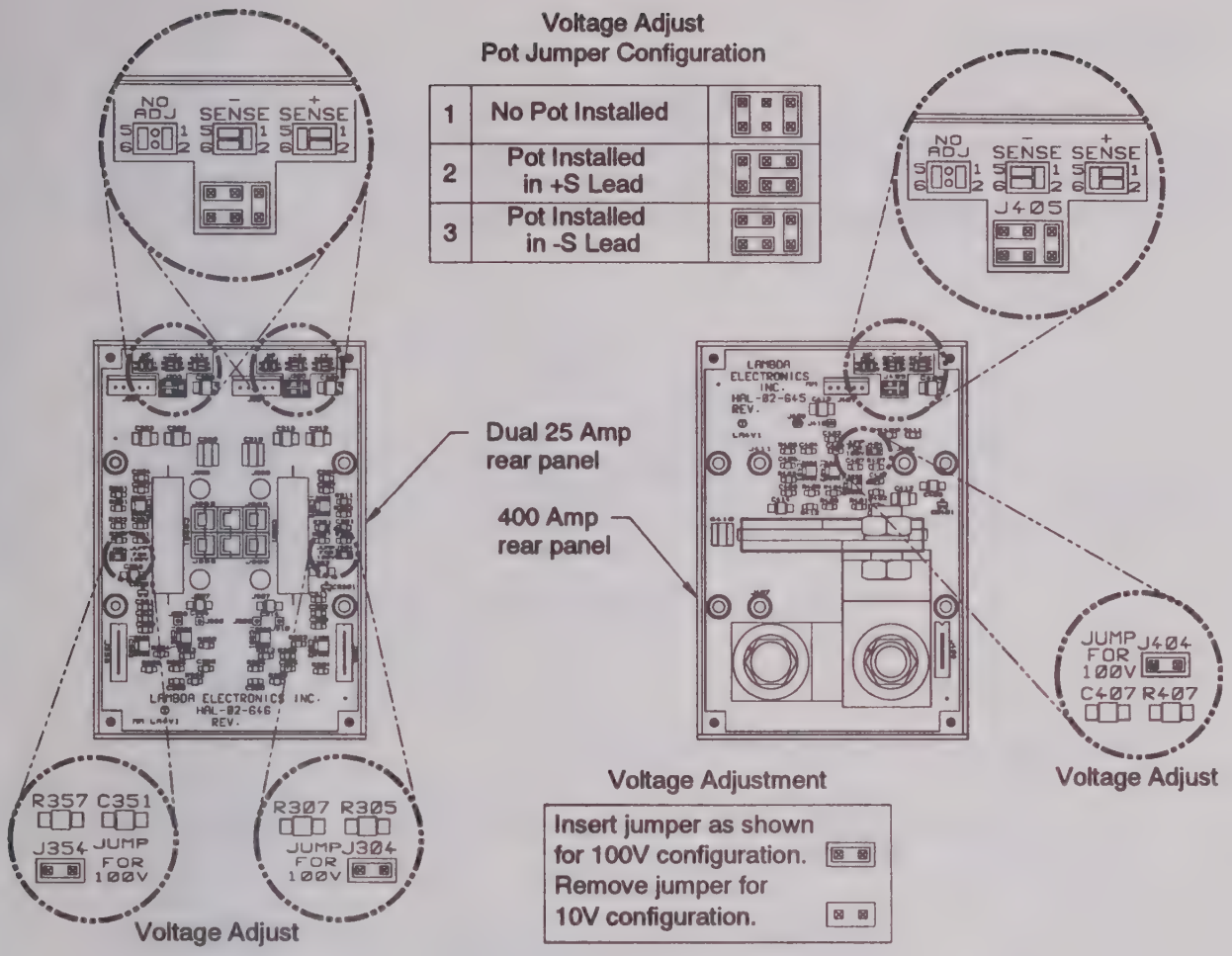


Figure 7-2 Rear Panel Jumper Configuration

7.2 Rear Panel Configuration

The rear panels all come preconfigured as per your requirements. Figure 7-2 shows the functions of the specific jumpers.

8.0 CALIBRATION

All calibration is done from the front panel. The information is stored in non-volatile memory. The switch is located on the front panel microcontroller printed wiring board, and is accessed by removing the top two front panel screws. After removing these, hinge the top of the panel outward. Refer to Figure 8-1 for the location of the switch, and see Figure 8-2 (page 22) for switch function.

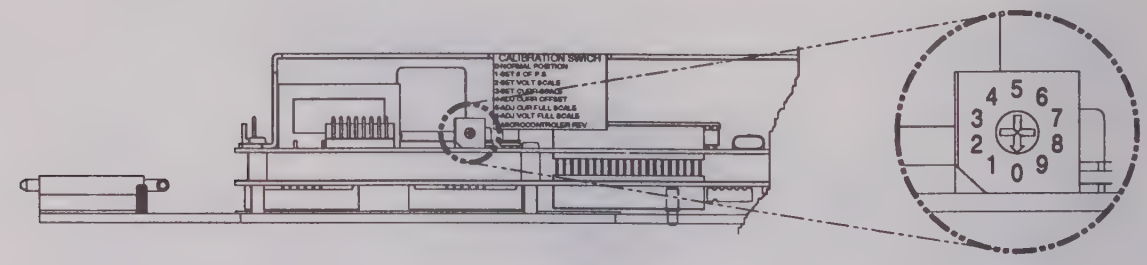


Figure 8-1 Calibration Switch and Location

8.1 Setting the Number of Power Supplies

Procedure - Set the calibration switch (S202) to position "1". The PS display should shown the number "1".

- Use the ADJUST UP or ADJUST DOWN keys until the correct number of power supplies is displayed.

- Save the displayed setting by pushing the ENTER key.

8.2 Setting the Voltage Scale

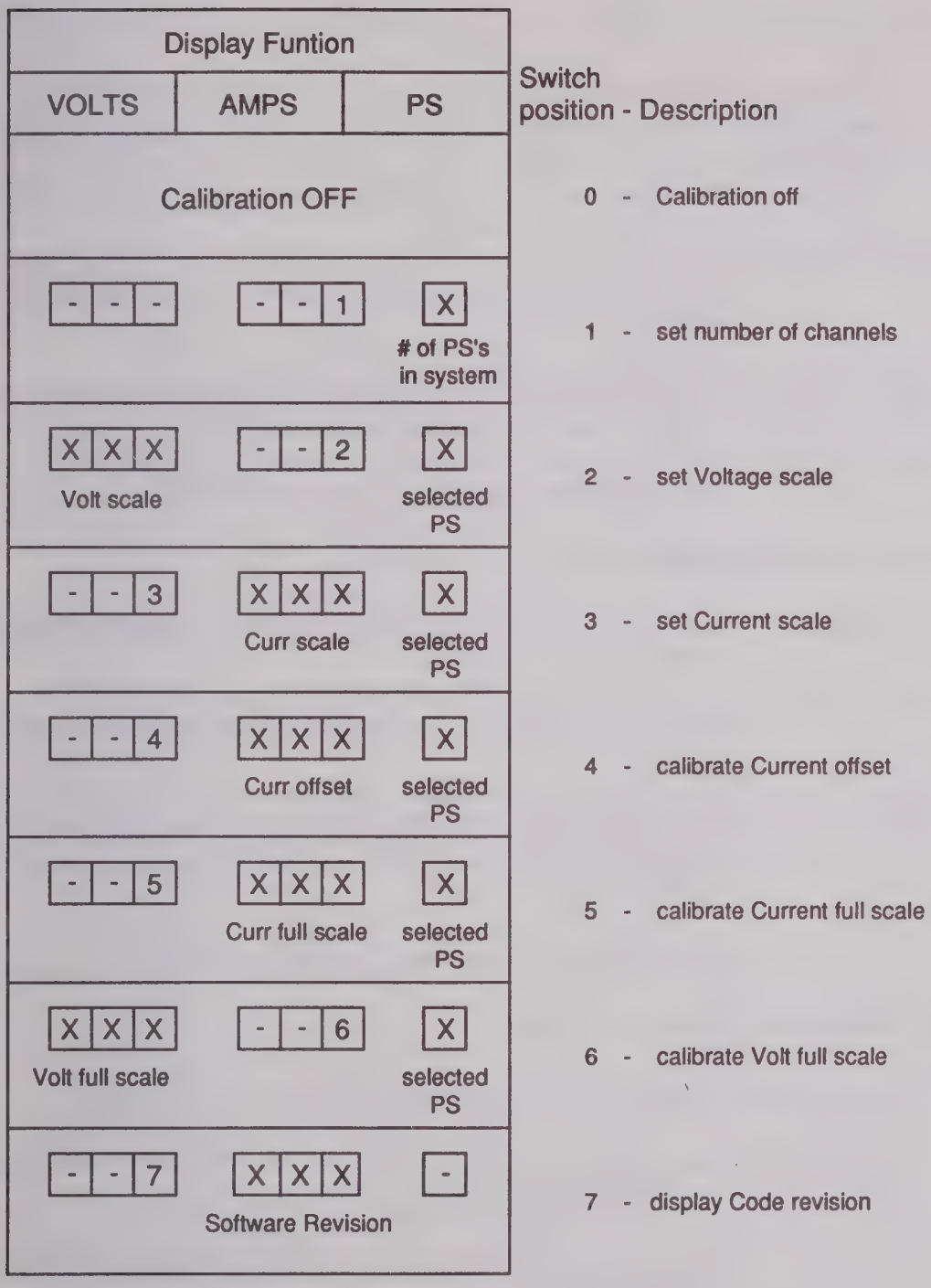
This operation allows for the selection of the proper scale (0 - 9.99 or 0 - 99.9) for each power supply. This would depend upon which jumper configuration you have chosen for the rear panel (J304, J354, J404).

Procedure - Set the calibration switch (S202) to position "2". The AMPS display should show the number "2".

- Push the PS SELECT key until the PS display shows the power supply you wish to calibrate.

- Use the ADJUST UP or ADJUST DOWN keys until the VOLTS display shows the desired scale (either 9.99 or 99.9).

- Save the displayed setting by pushing the ENTER key.



NOTE: "X" denotes any digit.

Figure 8-2 Calibration Modes

8.3 Setting the Current Scale

This operation allows for the selection of the proper scale (0 - 25.0 or 0 - 400) for each of the power supplies, depending upon the type of rear panel being used to monitor that channel.

Procedure - Set the calibration switch (S202) to position "3". The VOLTS display should show the number "3".

- Push the PS SELECT key until the PS display shows the power supply you wish to calibrate.

- Use the ADJUST UP or ADJUST DOWN keys until the AMPS display shows the desired scale (either 25.0 or 400).

- Save the displayed setting by pushing the ENTER key.

8.4 Calibrating the Current Offset

Procedure - Set the calibration switch (S202) to position "4". The VOLTS display should show the number "4".

- Push the PS SELECT key until the PS display shows the power supply you wish to calibrate.

- Use the ADJUST UP key if the AMPS display shows -0.0, or the ADJUST DOWN key if the display shows a reading of above zero. Do this until the AMPS display shows 0.0.

- Save the displayed setting by pushing the ENTER key.

8.5 Calibration of Current at Full Scale

This operation insures the accuracy of current measurement at full scale.

Procedure - Set the calibration switch (S202) to position "5". The VOLTS display should show the number "5".

- Push the SELECT key until the PS display shows the power supply you wish to calibrate.

- Use the ADJUST UP or ADJUST DOWN keys as appropriate, until the AMPS display agrees with an output current measurement for the power supply undergoing calibration. Note that each change of 1 LSB up or down in the display reading will require several clicks of the appropriate adjustment key.

- Save the displayed setting by pushing the ENTER key.

8.6 Calibration of Voltage at Full Scale

This operation insures the accuracy of voltage measurement at full scale.

Procedure - Set the calibration switch (S202) to position "6". The AMPS display should show the number "6".

- Push the PS SELECT key until the PS display shows the power supply you wish to calibrate.

- Use the ADJUST UP or ADJUST DOWN keys as appropriate, until the VOLTS display agrees with an output voltage measurement of the power supply undergoing calibration, made using a calibrated meter. Note that each change of 1 LSB up or down in the display reading will require several clicks of the appropriate adjustment key.

- Save the displayed setting by hitting the ENTER key.

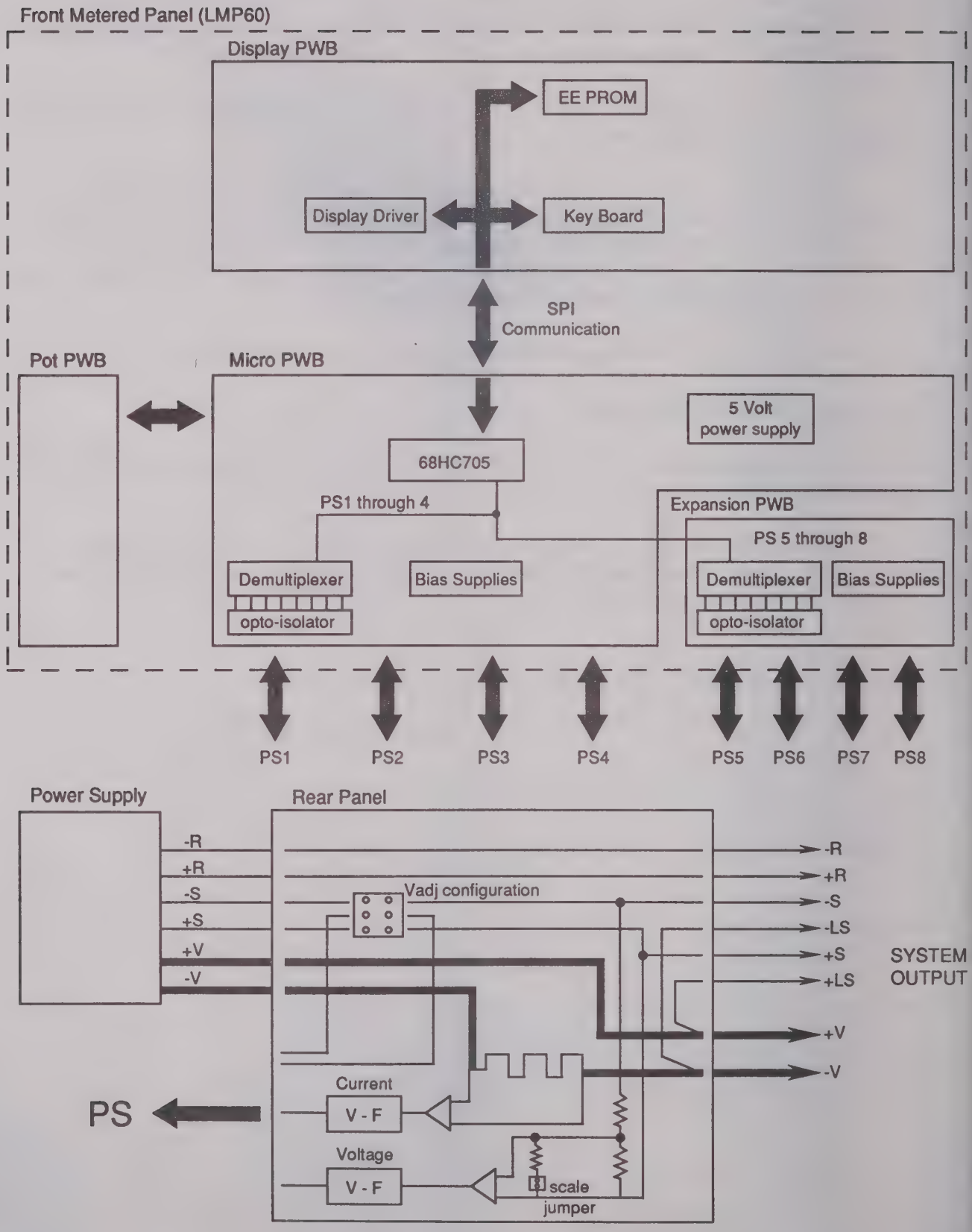
8.7 Display of Micro Rev Level

This operation displays the revision level of the microprocessor software installed in the system you are calibrating.

Procedure - Set the calibration switch (S202) to position "7". The VOLTS display should show the number "7". The AMPS display will show the software revision level.

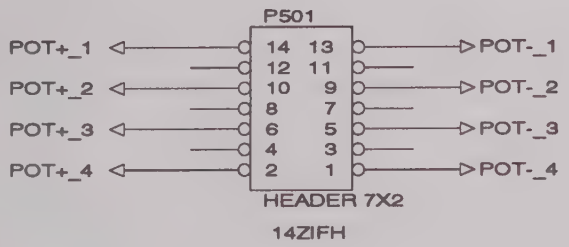
APPENDIX A

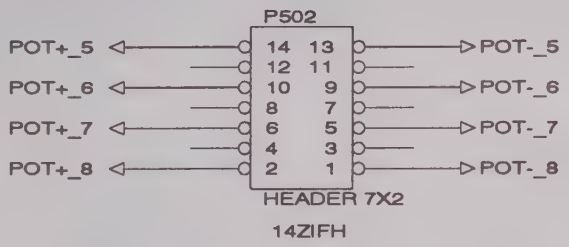
Block Diagram for a Metered System

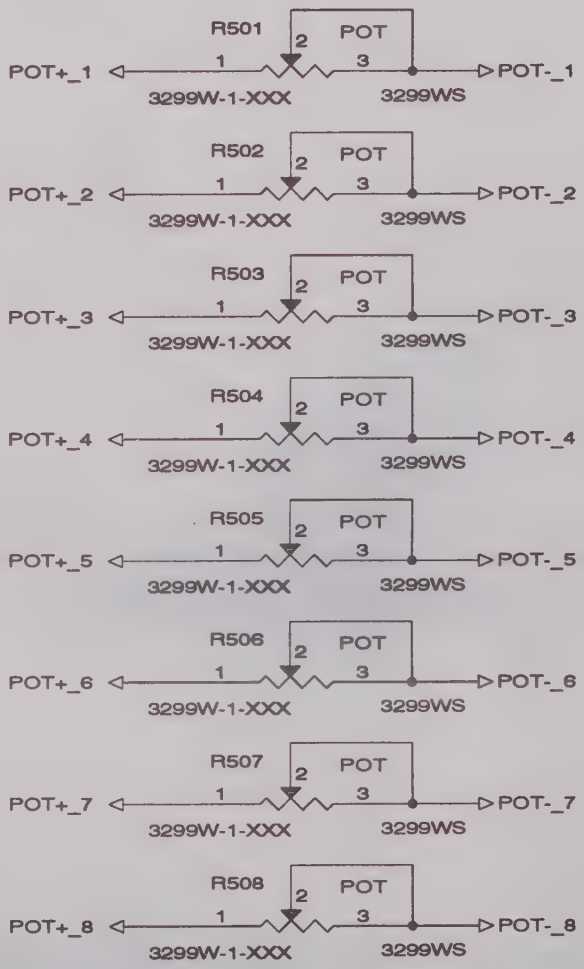


APPENDIX B - SCHEMATICS

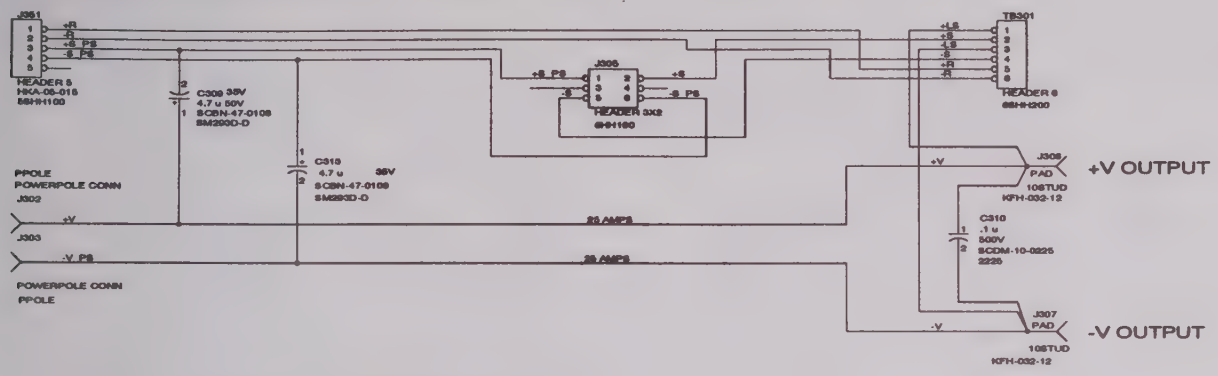
- Pot Board HAL-02-650 - Page 28
- 25 Amp Non-metered HAL-02-646-2 - Page 29
- 25 Amp Metered HAL-02-646 - Page 30
- 400 Amp Non-metered HAL-02-645-2 - Page 31
- 400 Amp Metered HAL-02-645 - Page 32
- Display Driver HAL-02-643 - Page 33
- Microcontroller HAL-02-644 - Page 34

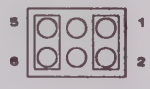
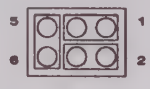
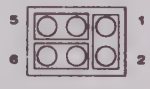


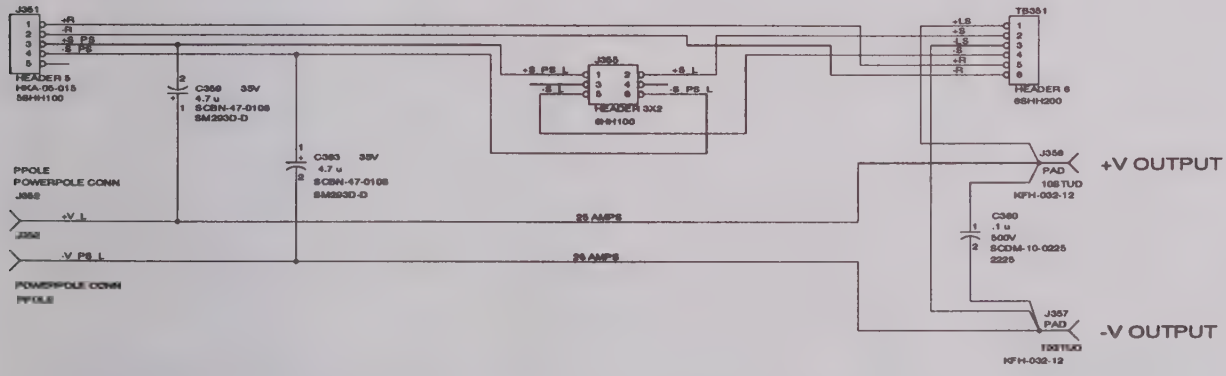


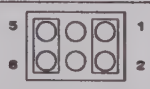
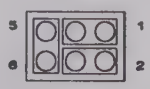
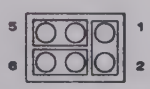


LAMBDA ELECTRONICS INC.		
Title: POT BOARD SCHEMATIC		
Size: A	Document Number: HAL-02-650	REV: A

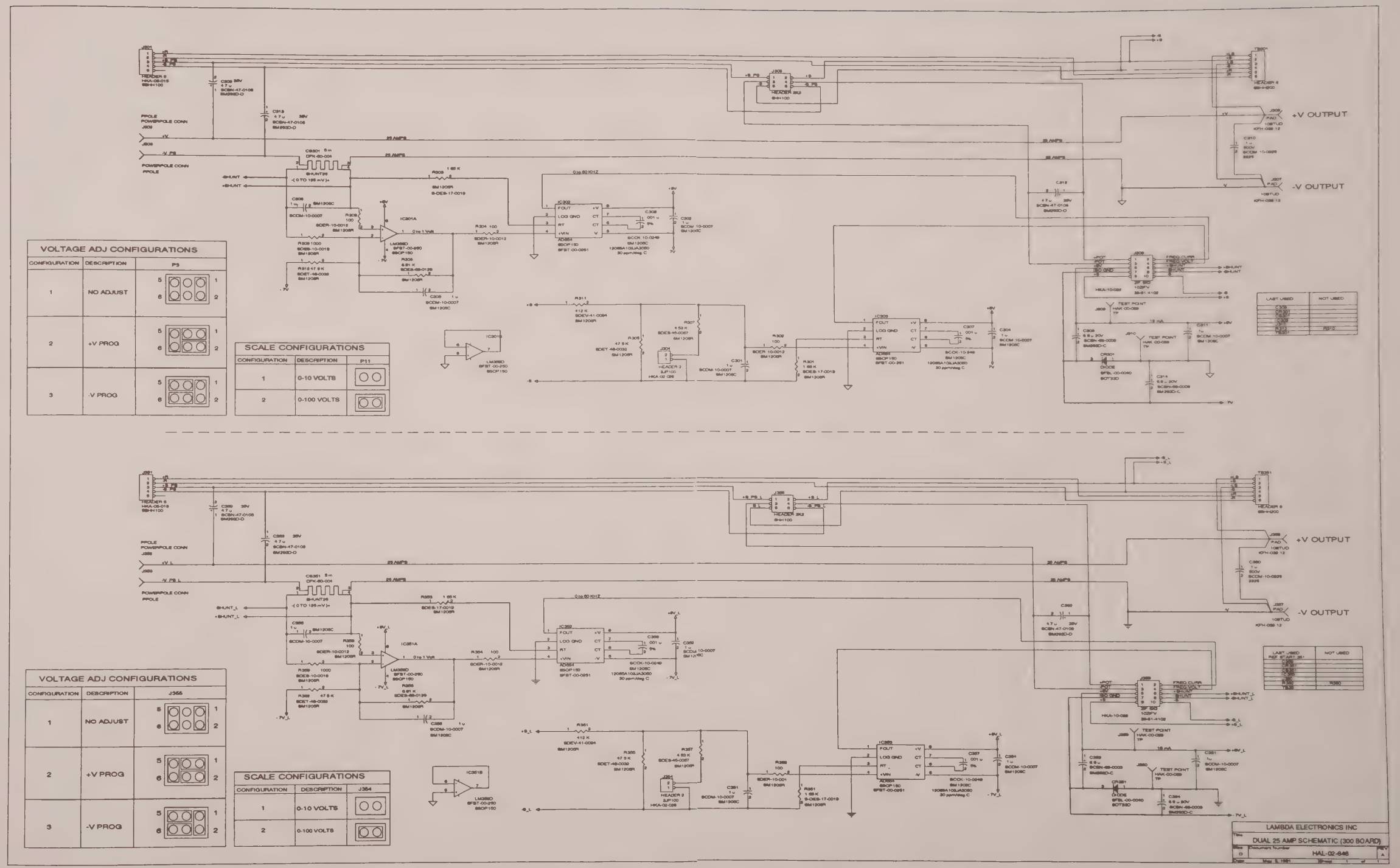


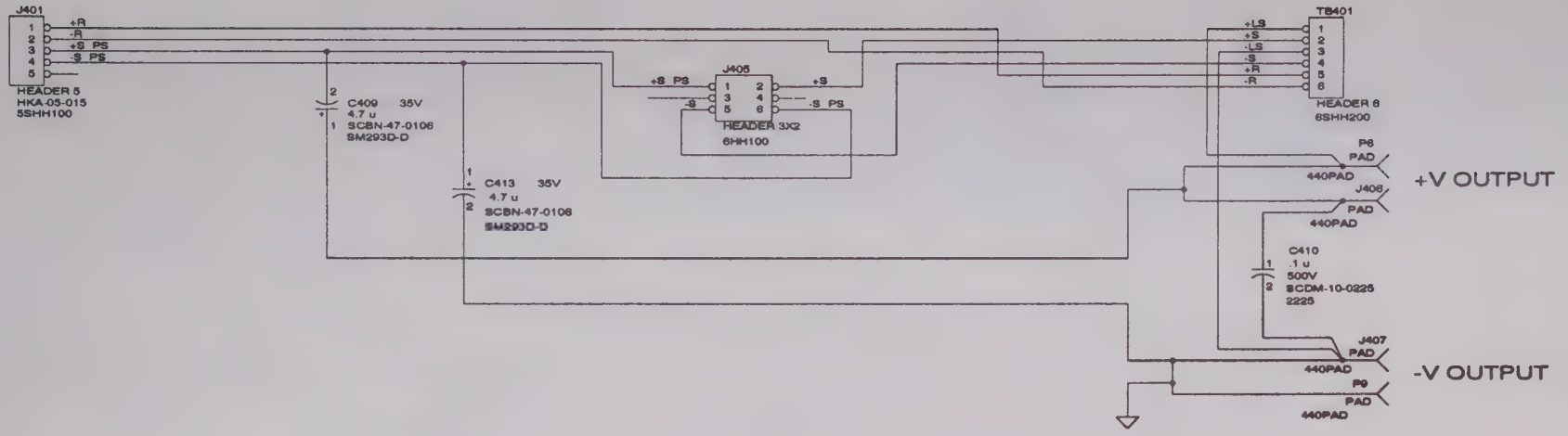
VOLTAGE ADJ CONFIGURATIONS		
CONFIGURATION	DESCRIPTION	J305
1	NO ADJUST	
2	+V PROG	
3	-V PROG	



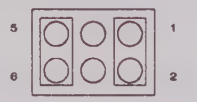
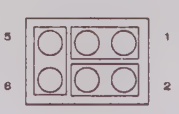
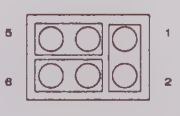
VOLTAGE ADJ CONFIGURATIONS		
CONFIGURATION	DESCRIPTION	J355
1	NO ADJUST	
2	+V PROG	
3	-V PROG	

LAMBDA ELECTRONICS INC.		
Title: DUAL 25 AMP NON METERED SCH.		
Size: D	Document Number: HAL-02-646-2	REV: A
Date: May 4, 1991	Sheet 1 of 1	

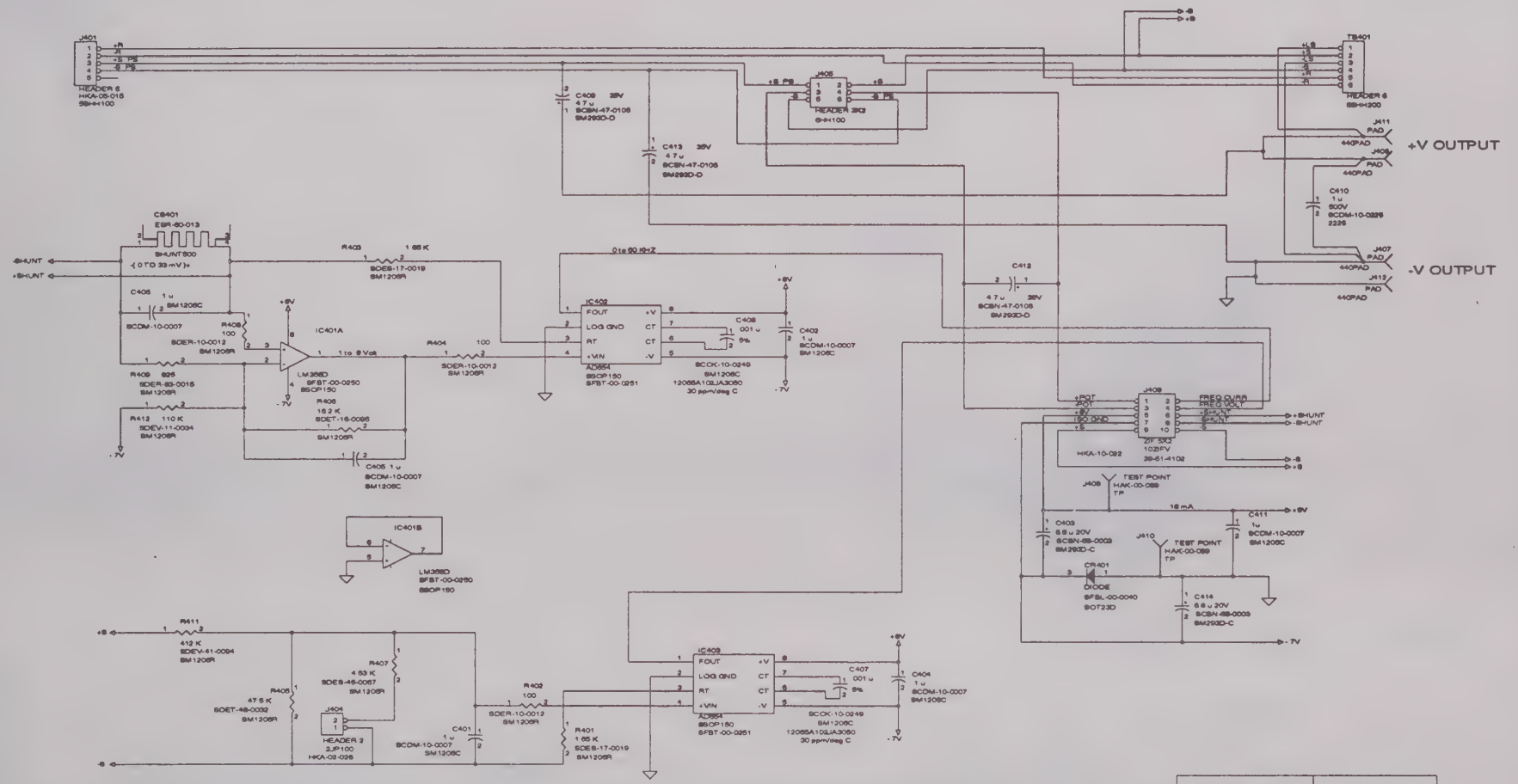

VOLTAGE ADJ CONFIGURATIONS
CONFIGURATION
DESCRIPTION
P3
1
NO ADJUST
2
+V PROG
3
-V PROG
SCALE CONFIGURATIONS
CONFIGURATION
DESCRIPTION
P11
1
0-10 VOLTS
2
0-100 VOLTS
+V OUTPUT
-V OUTPUT
25 AMPS
0 to 50 KHZ
LAST USED
NOT USED
VOLTAGE ADJ CONFIGURATIONS
CONFIGURATION
DESCRIPTION
J365
1
NO ADJUST
2
+V PROG
3
-V PROG
SCALE CONFIGURATIONS
CONFIGURATION
DESCRIPTION
J364
1
0-10 VOLTS
2
0-100 VOLTS
+V OUTPUT
-V OUTPUT
25 AMPS
0 to 50 KHZ
LAST USED
NOT USED
LAMBDA ELECTRONICS INC
DUAL 25 AMP SCHEMATIC (300 BOARD)
HAL-02-646



VOLTAGE ADJ CONFIGURATIONS

CONFIGURATION	DESCRIPTION	P3
1	NO ADJUST	
2	+V PROG	
3	-V PROG	

LAMBDA ELECTRONICS		
Title: 400 AMP NON METERED SCH. (400 BOARD)		
Size: D	Document Number: HAL-02-645-2	REV: A
Date: May 4, 1991	Sheet 1 of 1	

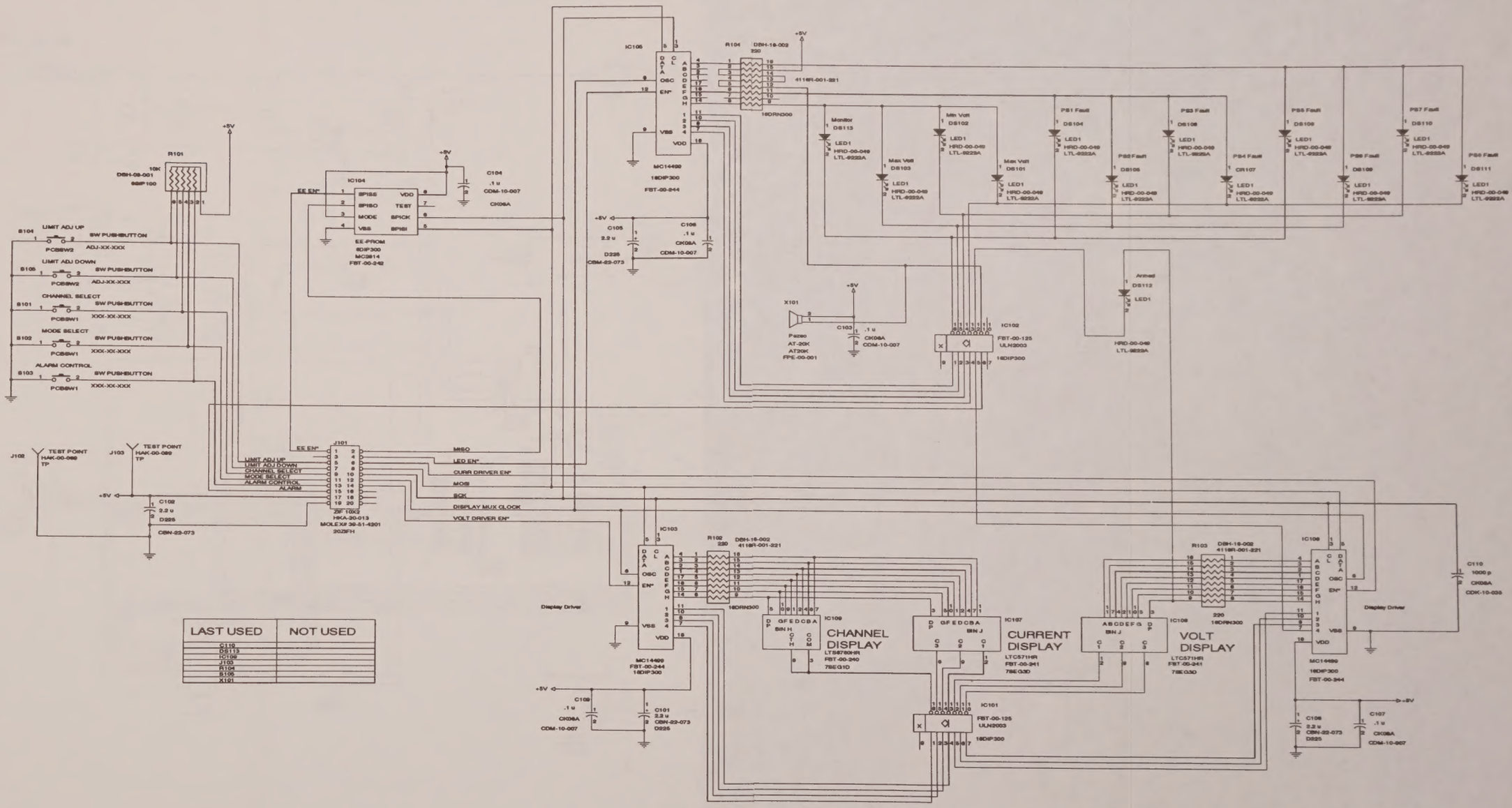


LAST USED	NOT USED
C412	
CR401	
CS401	
IC403	
J412	
R412	R410
TB401	

SCALE CONFIGURATIONS		
CONFIGURATION	DESCRIPTION	J404
1	0-10 VOLTS	
2	0-100 VOLTS	

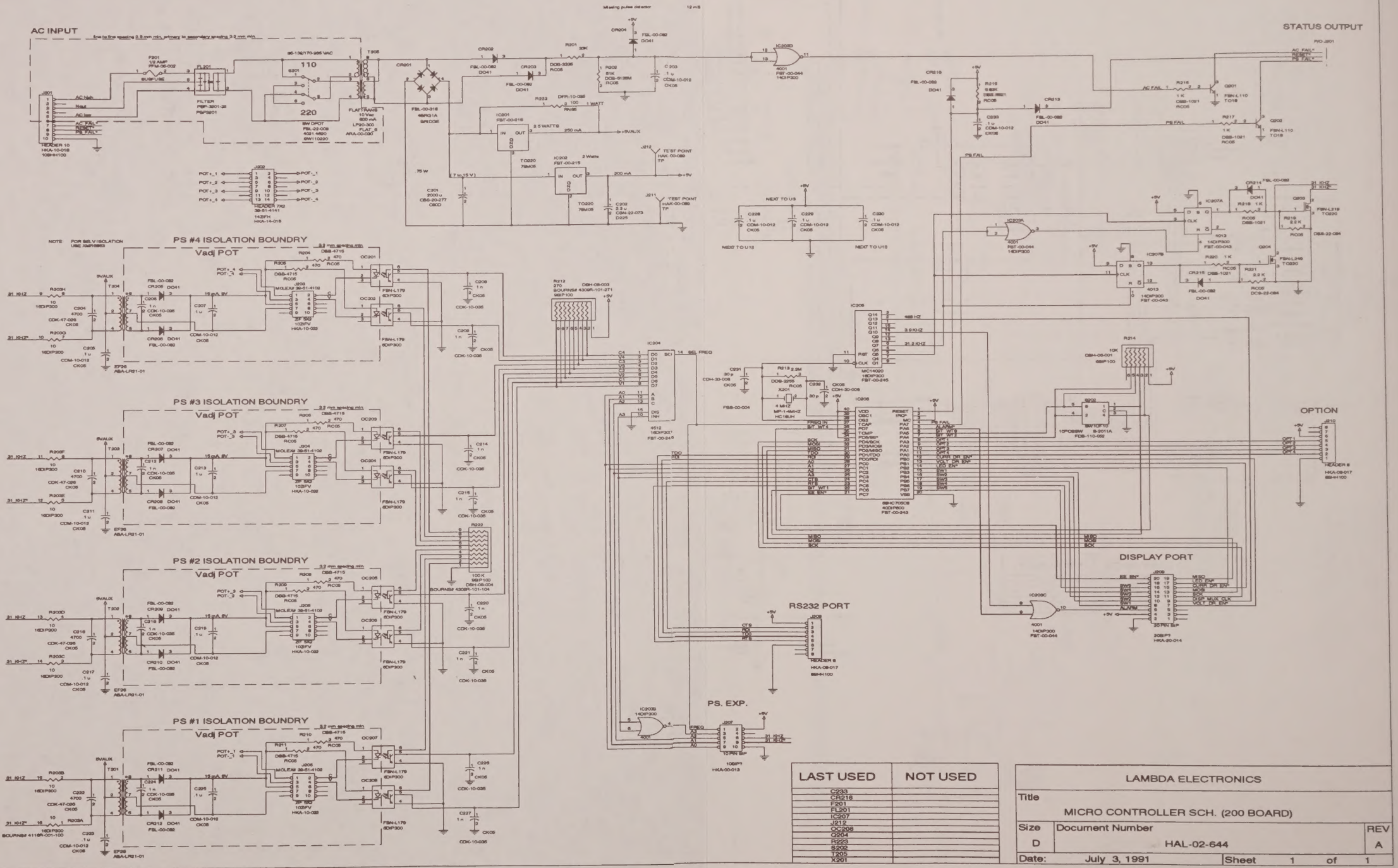
VOLTAGE ADJ CONFIGURATIONS		
CONFIGURATION	DESCRIPTION	J405
1	NO ADJUST	
2	+V PROG	
3	-V PROG	

LAMBDA ELECTRONICS		
Title: 400 AMP SCHEMATIC (400 BOARD)		
Size: B	Document Number: HAL-02-845	REV: A



LAST USED	NOT USED
C110	
DS113	
IC109	
J103	
R104	
S105	
X101	

LAMBDA ELECTRONICS		
Title: DISPLAY DRIVER SCHEMATIC (100 BOARD)		
Size: D	Document Number: HAL-02-643	REV: A
Date: July 10, 1991	Sheet 1 of 1	


AC INPUT
STATUS OUTPUT
PS #4 ISOLATION BOUNDRY
Vadj POT
PS #3 ISOLATION BOUNDRY
Vadj POT
PS #2 ISOLATION BOUNDRY
Vadj POT
PS #1 ISOLATION BOUNDRY
Vadj POT
OPTION
DISPLAY PORT
RS232 PORT
PS. EXP.
LAST USED
C233
CR216
F201
FL201
IC207
J212
OC208
Q204
R223
S202
T205
X201
NOT USED
LAMBDA ELECTRONICS
Title
MICRO CONTROLLER SCH. (200 BOARD)
Size
D
Document Number
HAL-02-644
REV
A
Date:
July 3, 1991
Sheet
1
of
1

LAMBDA ELECTRONICS INC.

515 BROAD HOLLOW RD., MELVILLE, NY 11747-3700 • TEL:516-694-4200 • FAX:516-293-0519